Claim Amendments

Please amend claims 1, 7, 11, 12, 15, 18, and 20 as follows.

1. (currently amended) A method for selectively etching a semiconductor feature openings to controllably ~~achieve~~ adjust a critical dimension ~~accuracy~~ comprising an upper portion of a feature opening comprising the steps of:

providing a semiconductor wafer comprising a first opening formed extending through a thickness of at least one dielectric insulating layer and having an uppermost inorganic BARC layer;

depositing a photoresist layer over the uppermost BARC layer and patterning the photoresist layer to form an etching pattern for etching a second opening overlying and encompassing the first opening;

carrying out a first plasma assisted etching process to etch through a thickness of the BARC layer comprising a predetermined amount of CO in a first plasma etching chemistry to form a predetermined critical dimension of a second opening upper portion including ~~increase~~ forming a hardened shell comprising the photoresist at the photoresist layer surface, said hardened shell having an increased etching resistance ~~of the photoresist layer~~; and,

carrying out a second plasma assisted etching process comprising a second plasma etching chemistry to etch through a thickness portion of the at least one dielectric insulating layer to form the second opening.

2. (Original) The method of claim 1, wherein the first and second openings comprise one a damascene and dual damascene structure.

3. (Original) The method of claim 1, wherein the inorganic BARC layer is formed of a material selected from the group consisting of silicon oxynitride, silicon oxycarbide, and titanium nitride.

4. (Original) The method of claim 1, wherein the photoresist layer is formed of a photoresist comprising one of an I-line novolak photoresist and a DUV photoresist.

5. (Original) The method of claim 1, wherein the photoresist layer comprises polymeric monomer groups selected from the group consisting of hydroxystyrenes and acrylates.

6. (Original) The method of claim 1, wherein the predetermined amount of CO comprises from about 3 percent to about 20 percent by volume of the plasma etching chemistry.

7. (currently amended) The method of claim 1, wherein the plasma etching chemistry comprising the first plasma assisted etching process consists essentially of at least one of a hydrofluorocarbon and fluorocarbon, nitrogen, an inert gas, and carbon monoxide.

8. (original) The method of claim 7, wherein the first plasma assisted etching process operating conditions include an operating pressure of between about 30 milliTorr and about 200 milliTorr, an RF power of between about 200 Watts and about 1000 Watts, and a flow rate of CO between about 5 sccm and about 100 sccm.

9. (original) The method of claim 1, wherein patterning the photoresist layer comprises at least one of an ultraviolet treatment process and a post development baking process following development of the photoresist.

10. (original) The method of claim 1, further comprising the step of an ashing process comprising CF_4 and oxygen (O_2) to remove the photoresist layer following the step of carrying out a second plasma assisted etching process.

11. (currently amended) The method of claim 1, wherein the ~~predetermined amount of CO is selectively added to control~~ second opening is formed having a tapered sidewall angle defined by ~~an upper portion of~~ the second opening upper portion and a bottom portion of the second opening, said tapered sidewall angle between about 0.2 degrees and about 2 degrees.

12. (currently amended) A method for selectively etching a semiconductor feature openings to with an increased photoresist etching resistance to achieve a predetermined BARC opening critical dimension for controlling a feature opening sidewall profile comprising the steps of:

providing a semiconductor wafer comprising a first opening formed extending through a thickness of at least one dielectric insulating layer and having an uppermost inorganic BARC layer;

depositing a photoresist layer over the uppermost BARC layer and patterning the photoresist layer to form an etching pattern for etching a second opening overlying and encompassing the first opening;

carrying out a first plasma assisted etching process comprising a first plasma etching chemistry having a predetermined amount of CO to etch through a thickness of the BARC layer to form an increased or decreased BARC opening portion critical dimension including ~~to increase~~ increasing [[an]] the

photoresist layer etching resistance by inducing polymeric cross-linking reactions [[in]] at the photoresist layer surface; and,

carrying out a second plasma assisted etching process comprising a second plasma etching chemistry to etch through a thickness portion of the at least one oxygen containing dielectric insulating layer according to the BARC opening portion to form [[a]] the second opening comprising ~~a predetermined CD bias~~.

13. (original) The method of claim 12, wherein the first and second openings comprise one of a damascene and dual damascene structure.

14. (original) The method of claim 12, wherein the inorganic BARC layer is formed of a material selected from the group consisting of silicon oxynitride, silicon oxycarbide, and titanium nitride.

15. (currently amended) The method of claim 12, wherein the photoresist layer is formed of a photoresist selected ~~form~~ from the group consisting of novolak resins ~~including at least one photosensitizer~~, and DUV photoresists ~~comprising at least one photogenerated acid (PAG)~~.

16. (original) The method of claim 12, wherein the photoresist layer is formed of a photoresist comprising functional groups selected from the group consisting of hydroxystyrenes, acrylates, and cyclic olefins.

17. (original) The method of claim 12, wherein the predetermined amount of CO comprises from about 5 percent to about 20 percent by volume of the plasma etching chemistry.

18. (currently amended) The method of claim 1, wherein the first plasma etching chemistry consists essentially of at least one of a hydrofluorocarbon and fluorocarbon, nitrogen, an inert gas, and carbon monoxide.

19. (original) The method of claim 1, wherein patterning the photoresist layer comprises at least one of a deep ultraviolet (DUV) treatment process and a post development baking process following development of the photoresist.

20. (currently amended) The method of claim 1, wherein the ~~predetermined amount of CO is selectively added to control~~ the second opening is formed having a tapered sidewall angle defined by an upper portion of the second opening and a bottom portion of the second opening between about 0.2 degrees and about 2 degrees.